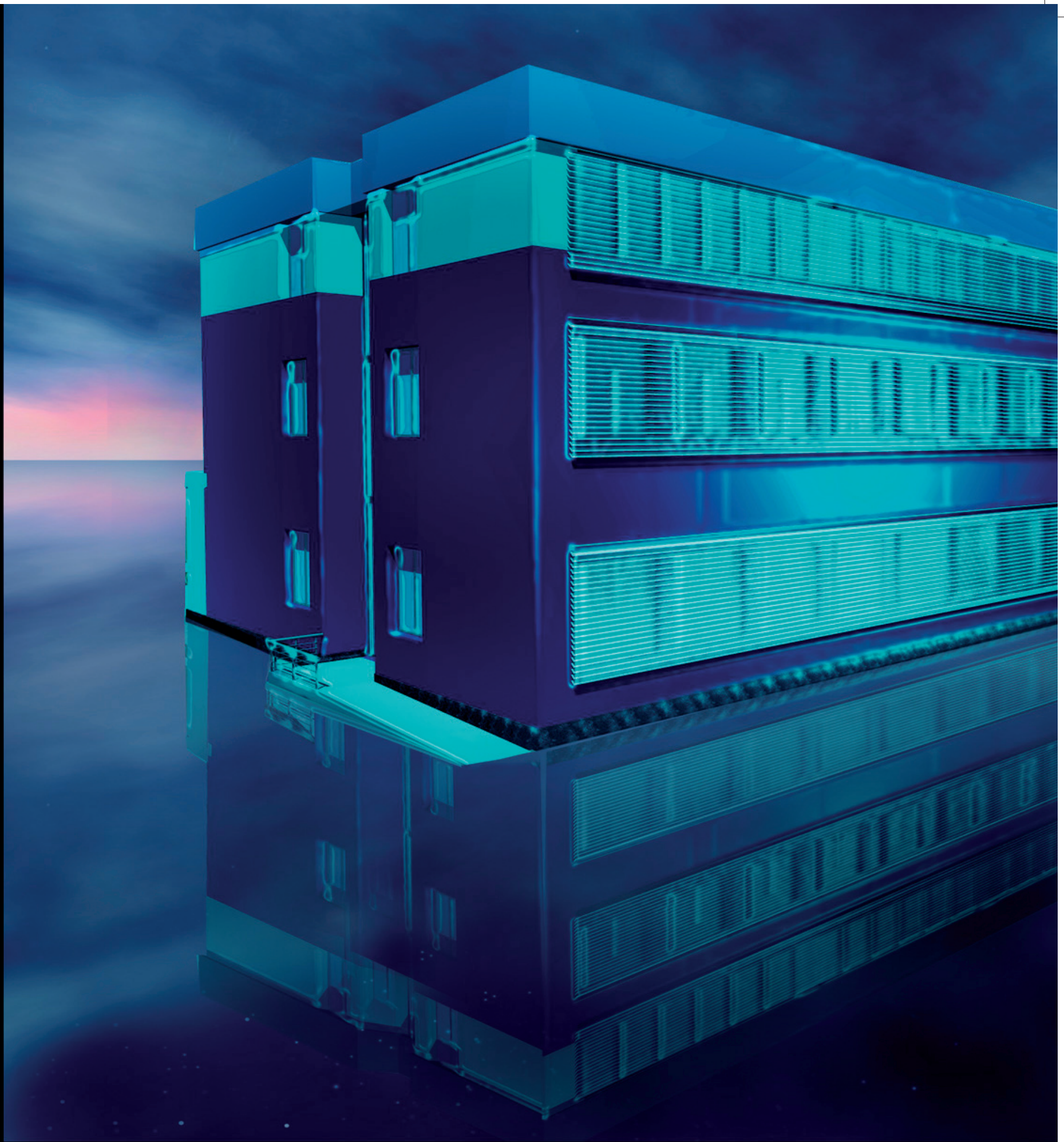


MEĐUNARODNI ZNANSTVENI SIMPOZIJ **MODELIRANJE KONSTRUKCIJA**

INTERNATIONAL SCIENTIFIC SYMPOSIUM
MODELING OF STRUCTURES

INTERNATIONALES WISSENSCHAFTLICHES SYMPOSIUM
BAUMODELLIERUNG





GF u plazmatičnom prostoru

KOMPJUTORSKA GRAFIKA: ROBERTA B. BARBARIĆ



Roberta B. Barbarić 2008.



UNIVERSITY OF MOSTAR
FACULTY OF CIVIL ENGINEERING



International Scientific Symposium
MODELING OF STRUCTURES



PROCEEDINGS

MOSTAR
2008

PREDGOVOR

Održavanje Međunarodnog znanstvenog simpozija Modeliranje konstrukcija poklapa se s proslavom tridesete obljetnice Građevinskog fakulteta Sveučilišta u Mostaru. Ovaj značajni jubilej Građevinski fakultet odlučio je obilježiti na način koji dolikuje jednoj znanstvenoj instituciji ovoga ranga i tradicije. Cilj je bio okupiti relevantne znanstvenike iz cijeloga svijeta kako bi se odabrana tema obradila na najcjelovitiji način i bila u potpunosti znanstveno utemeljena, obrađena i verificirana. Zbog toga su u pripremi i radu na organizaciji Simpozija kroz Znanstveni odbor, Recenzijski odbor ili pisanje znanstvenih članaka sudjelovali znanstvenici iz više od 20 zemalja svijeta sa šest kontinenata.

Međunarodni znanstveni simpozij Modeliranje konstrukcija održava se pod pokroviteljstvom Ministarstva znanosti, obrazovanja i športa Vlade Republike Hrvatske, za pokrovitelja ministar prof. dr. sc. Dragan Primorac. Inače, Vlada Republike Hrvatske je i najzaslužnija za konačno osuvremenjivanje Građevinskog fakulteta, odnosno za finalizaciju naše težnje duge tri desetljeća za dobivanjem vlastita prostora. Sada smo napokon, uz značajne kadrovske pomake i financijsku stabilizaciju Fakulteta, dobili i prostornu slobodu za nastavak još uspješnijeg djelovanja u novoj zgradi u godinama koje su pred nama.

Posebno nam je zadovoljstvo pozdraviti svakoga sudionika Simpozija i zahvaliti svim prijateljima Građevinskog fakulteta koji su na bilo koji način pomogli u njegovoj organizaciji. Uz iskrene želje za uspješan rad i ugodan boravak u gradu Mostaru želim da Međunarodni znanstveni simpozij Modeliranje konstrukcija donese, pored osvježavanja starih i uspostavljanja novih poznanstava i druženja, također i nova saznanja, vrijednosti i znanstvene poticaje u području koje obrađuje.

Dekan Građevinskog fakulteta
Sveučilišta u Mostaru
Prof. dr. sc. Ivo Čolak

FOREWORD

The organization of the International Scientific Symposium Modeling of Structures coincides with the celebration of the thirtieth anniversary of the Faculty of Civil Engineering in Mostar. The Faculty of Civil Engineering decided to mark this special jubilee in the way that is appropriate for a scientific institution of this level and tradition. Our goal was to convene relevant scientists from all over the world in order that the selected topic would be elaborated in the most comprehensive way and that it would be fully scientifically founded, treated and verified. For that reason, scientists from over twenty world countries and six continents participated in the preparation and activities in the organization of the symposium through the Scientific Committee, Review Committee or writing of scientific papers.

The International Scientific Symposium Modeling of Structures is held under the sponsorship of the Ministry of Science, Education and Sports of the Government of the Republic of Croatia, Minister Dragan Primorac, Ph.D., on behalf of the sponsor. Otherwise, the Government of the Republic of Croatia is the most merited for the final modernization of the Faculty of Civil Engineering, or for the finalization of our three-decades-long aspiration to have premises of our own. With significant personnel shifts and financial stabilization of the faculty, now we have finally gained space freedom for the resumption of our even more successful activity in the new building in years to come.

It is our special pleasure to greet every participant of the symposium and thank all friends of the Faculty of Civil Engineering who assisted in its organization in any way. With sincere wishes for a successful work and enjoyable stay in the city of Mostar, I wish the International Scientific Symposium Modeling of Structures, in addition to refreshing old contacts and friendships and establishing new ones, also brings new perceptions, values and scientific motivations in the field that it treats.

Dean of the Faculty of Civil Engineering,
University of Mostar
Prof. Ivo Čolak, Ph. D.

VORWORT

Die Abhaltung des Internationalen wissenschaftlichen Symposiums, Modellieren der Konstruktionen, fällt mit der Feier des dreißigsten Jahrestages unserer Bau fakultät der Universität in Mostar zusammen. Dieser bedeutende Jubiläumstag wird die Bau fakultät auf eine besondere Art und Weise feiern, die einer Institution dieses Grades und Tradition passt. Unser Ziel war relevante Wissenschaftler aus der ganzen Welt zu sammeln, damit das gewählte Thema auf eine qualitative Art und Weise bearbeitet wird, und vollkommen wissenschaftlich verifiziert wird. An der Vorbereitung dieses Symposiums nahmen Wissenschaftler aus mehr als zwanzig Ländern von sechs Kontinenten teil. Sie halfen uns durch den Wissenschaftsrat, Rezensentenrat und Schreiben der Wissenschaftsartikel.

Internationales wissenschaftliches Symposium, Modellieren der Konstruktionen, findet unter der großen Schirmherrschaft des Wissenschafts-, Bildungs- und Sportministers, Prof. Dr. Dragan Primorac. Die Regierung der Republik Kroatien ist verdient für die endliche Modernisierung unserer Bau fakultät. Sie ermöglichten uns Vollendung unseren Traumes, zur erreichen eigenen Räume, der dreißig Jahre lang war. Jetzt bekamen wir endlich, mit bedeutenden Personalvermehrung und finanziellen Stabilisation, eine Raumfreiheit für die Fortsetzung unserer Tätigkeiten im neuen Gebäude, für Jahre, die uns noch bevorstehen. Uns ist eine besondere Freude jeden Teilnehmer dieses Symposiums zu grüßen, und allen Freunden der Bau fakultät zu danken, die auf irgendeine Art in der Organisation geholfen haben. Mit ehrlichen Wünschen für erfolgreiche Arbeit und angenehmen Aufenthalt in Stadt Mostar, möchte ich, dass das Internationale Symposium Modellieren der Konstruktionen, neben der zusammenschließen der neuen Freundschaften auch alte Freundschaften erwacht. Ich möchte auch, dass dieses Symposium neue Erkenntnisse, Werte, und wissenschaftliche Anregerungen erzielt.

Dekan der Bau fakultät der Universität in
Mostar
Prof. Dr. Ivo Čolak

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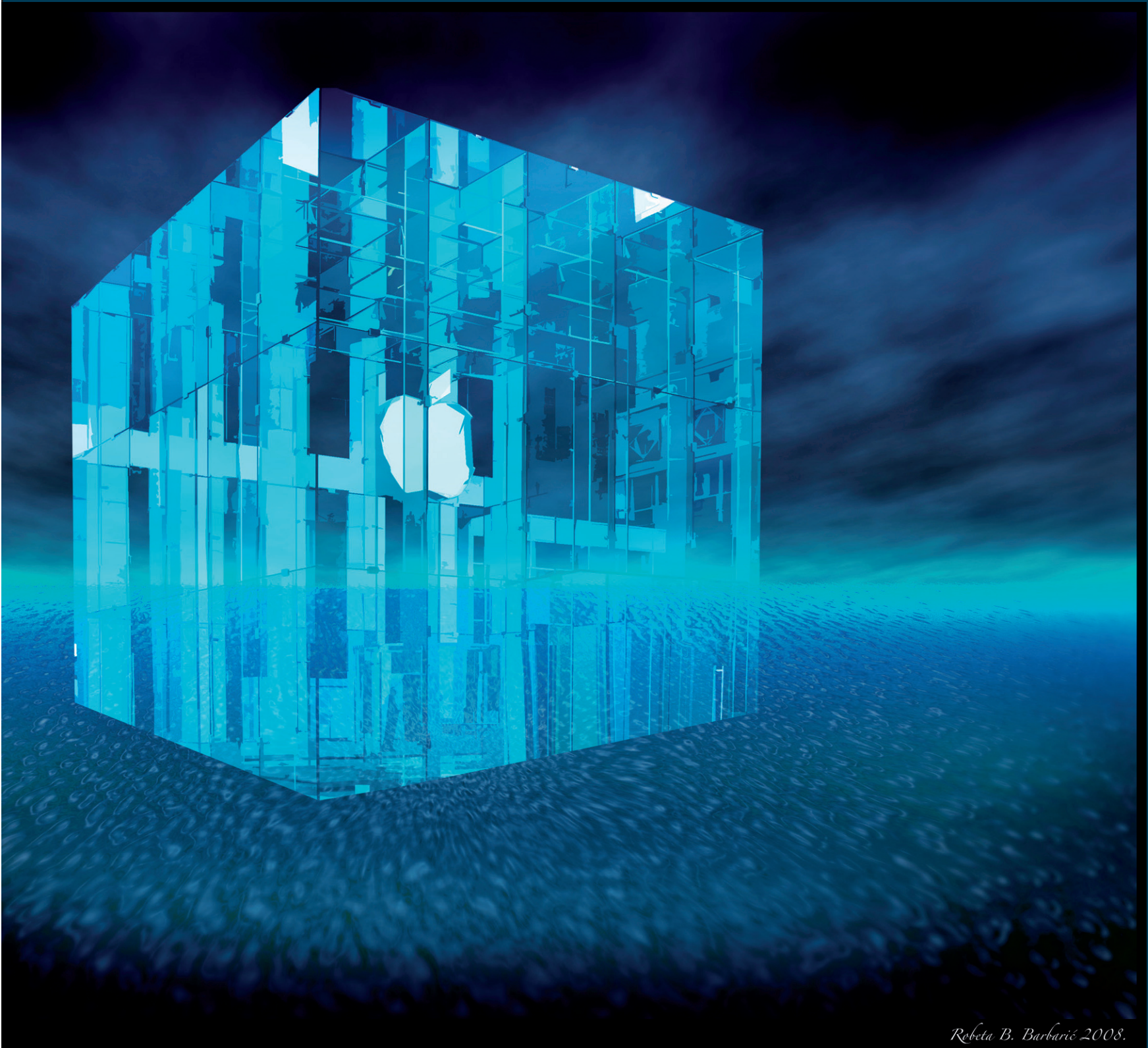
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Roberta B. Barbarić 2008.

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